Altera Software Installation and Licensing Manual

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1. Installing Altera Software

The *Altera Software Installation and Licensing* manual provides comprehensive information for installing and licensing Altera software, including the Quartus II software, ModelSim-Altera Edition software, Nios® II Embedded Design Suite, and related software on Windows and Linux operating systems.

This chapter describes installing Altera software from the Download Center of the Altera website and the Altera Complete Design Suite DVDs, which are available by request via the Altera IP and Software DVD Request Form.

Altera Software

You can use any of the following methods to download Altera software from the Download Center of the Altera website:

- Altera Installer—an on-demand download manager that downloads and installs the software that you specify, including device support and software listed under Individual Components below.
- Individual Components—individually download and install the following software for Windows or Linux:
  - Quartus II Subscription Edition software v12.0 (includes the Nios II EDS and MegaCore IP Library) (32-bit and 64-bit)
  - Quartus II Web Edition software v12.0 (includes the Nios II EDS and MegaCore IP Library) (32-bit) (64-bit for Red Hat Linux Enterprise 6 and CentOS 6 only)
  - Device support for Stratix, HardCopy, Arria, Cyclone, MAX, and legacy device families
  - ModelSim-Altera Starter Edition software v10.0d for Quartus II software v12.0 (32-bit)
  - ModelSim-Altera Edition software v10.0d for Quartus II software v12.0 (32-bit)
  - DSP Builder v12.0

The available Altera Complete Design Suite Subscription Package v12.0 DVDs include all the software and device support listed above.

Refer to the Operating System Support page for the most up-to-date Altera software operating system support information.

System Requirements

To successfully install and run Altera software, your system must meet the following minimum requirements.

Hardware

- Windows PC or Linux workstation. Refer to the Operating System Support page of the Altera web site for the most up-to-date Altera software operating system requirements.
  - PCs running Windows XP are capable of running the 32-bit version of the Quartus II software with access to virtual memory of 2 GB. PCs running Windows XP Professional x64 Edition, Windows Vista, or Windows 7 are capable of running the 32-bit version of the Quartus II software with access to virtual memory of up to 4 GB and the 64-bit version of the Quartus II software with access to virtual memory of more than 4 GB.
  - 32-bit Linux workstations are capable of running the 32-bit version of the Quartus II software with access to virtual memory of up to 4 GB. If your Quartus II project requires addressability of virtual memory greater than 4 GB, you must use the 64-bit version of the Quartus II software on a 64-bit Windows PC or Linux workstation.
- A monitor capable of at least 768x1024 display resolution.
- Adequate disk space as described in the *Quartus II Software Device Support Release Notes*.
- DVD drive (DVD installation only).

Cables and Ports

- Parallel port for connecting a ByteBlaster™ II or ByteBlasterMV™ parallel port download cable or parallel port software guard (Windows XP 32-bit only). If you want to use a ByteBlaster cable on a system running Windows Vista 32-bit, you must first manually install the ByteBlaster cable driver.
- Serial port for connecting a MasterBlaster™ communications cable.
- USB port for connecting a USB-Blaster™ download cable, a MasterBlaster communications cable, the Altera Programming Unit (APU), or a USB software guard.
- 10/100 Mb Ethernet connection for connecting a EthernetBlaster download cable.

Software

- Either Mozilla Firefox version 3.6 or later, or Microsoft Internet Explorer version 8.0 or later, with an Internet connection for Quartus II software Internet resources.
- Adobe Flash Player version 7.0 or later, for the Quartus II Getting Started Tutorial.
- The **KDE** or **GNOME** window manager (version included with your Linux operating system installation).
- The native XServer software for Linux.

Uninstalling Altera Software

To uninstall a previous version of Altera software:

- For Microsoft Windows, on the Windows Start menu, point to **Programs**, (**All Programs** in Windows 7), point to **Altera**, and then:

  Click **Modify Altera Complete Design Suite** <*version number*>.

  or

  Point to <*software name*> <*version number*>, and then click **Uninstall** <*software name*> <*version number*>.

  The Altera Installer appears and guides you through the uninstallation process.
- For Linux, make sure that none of your project files are contained in the Altera software directory, and then delete the Altera software directory (default name is **altera** <*version number*>).

Modifying Altera Software

To modify an existing installation of Altera software to add device family support, or support for any other product available with the Altera Installer:

- For Windows, on the Windows Start menu, point to **Programs** (in Windows 7, point to **All Programs**), point to **Altera**, and then click **Modify Altera Complete Design Suite** <*version number*>.
- For Linux, type the following command at a command prompt:

```
altera_installer_cmd --update --gui↵
```

The Altera Installer appears and guides you through the modification process.

Altera.com Download Center

The following items are available from the Download Center of the Altera website:

- Software and components listed in "Altera Software" on page 1–1
- Programming software
- Board layout and test software
- Altera legacy design software
- License daemons

Altera Installer

The Altera Installer allows you to download and install Altera software for Windows or Linux, on-demand with one custom download and installation manager. You can choose to download and install the software listed in "Altera Software" on page 1–1.

You can customize your Altera software installation by specifying the software and device family support you want to install. Additionally, you can specify the directories where you want to install the software and set up proxy server options. You can choose to download the installation files first, and then install software later. You can also install software on multiple systems using the same set of installation files, which reduces overall download time.

After customizing your software installation, you can review the installation summary, which lists all of the options that you specified during the setup process, before starting the download and installation process.

You can turn on the TalkBack feature by turning on **Turn on the Quartus II software TalkBack feature** in the **TalkBack Options** dialog box, which appears at the end of the installation process if the option is not already turned on.

For more information about turning on the TalkBack feature in the Quartus II software, refer to *Accessing Quartus II Internet Resources on the Web* in Quartus II Help.

You can also install software at the command line using command-line arguments. You can download and immediately install the software, or download the software first, and then install later. You can also install software on multiple systems at the command line using the same set of installation files that you download once.

Individual Software Files

You can choose to download and install Altera software, listed in "Altera Software" on page 1–1, individually from the Download Center.

If you download and install the Quartus II software individually, you must also download and install device support separately.

You can individually download and install each software package with the Altera Installer, which automatically starts once you begin the installation process. The Altera Installer allows you to specify installation options, as described in "Downloading and Installing Software with the Altera Installer" on page 1–5, and guides you through the installation process.

Downloading and Installing Altera Software

This section describes prerequisites and instructions for downloading and installing Altera software for Windows or Linux.

Download and Installation Prerequisites

Read the following information before you download and install Altera software:

- You must have system administrator privileges (Windows only).
- Commands that do not fit on a single line in this manual are indicated by indentations of subsequent lines (Linux only).
- Ensure there is at least 20 GB of free disk space to contain copies of uncompressed version installation files. Disk space requirements for individual components are described on the Download Center of the Altera website.
- If your computer runs Windows XP Professional x64 Edition or Windows Server 2003 (64-bit), your system may have insufficient contiguous virtual memory to properly download software with the Altera Installer. If you encounter an insufficient memory error with the Altera Installer, you must install the Windows hotfix (KB925336), which is available on the Microsoft website.

- The following RPM packages are required to install and run the Altera Complete Design Suite (ACDS) and the Altera Installer on systems running Red Hat Linux Enterprise 6 or CentOS 6:
  - 32-bit libraries: expat.i686, fontconfig.i686, freetype.i686, glibc.i686, gtk2.i686, libcanberra-gtk2.i686, gtk2-engines-2.18.4-5.el6.centos.i686, libpng.i686, libICE.i686, libSM.i686, libuuid.i686, ncurses-libs.i686, PackageKit-gtk-module.i686, and zlib.i686
  - X Window libraries: libX11.i686, libXau.i686, libXdmcp.i686, libXext.i686, libXft.i686, libXrender.i686, libXt.i686, and libXtst.i686.

  For more information about RPM packages, visit the Red Hat website.
- When you specify the installation directory, use only alphanumeric characters and do not type any special characters or symbols, such as !$%^&*<>, empty spaces, or non-English characters. Including special characters may invalidate the installation location.
- By default, the Altera Installer installs Altera software in the <*drive*>**:\altera**<*version number*> system directory for Windows, and the <*home directory*>**/altera/**<*version number*> directory for Linux, where <*home directory*> is the default directory of your Linux workstation, or as set by your system administrator. If you use a different directory name, substitute the appropriate name for <*system directory*> in the installation steps.
- You can install multiple copies of the same version of Altera software on the same computer. You can define the name and designate the copy of the Altera software to receive service packs for subsequent installations of the software.
- If you want to preserve project compilation databases from an earlier version of the Quartus II software before installing a newer version, Altera recommends that you open the design in the earlier version of the software and export a version-compatible database for the design.

  For more information about importing and exporting version-compatible databases in the Quartus II software, refer to the *Managing Quartus II Projects* chapter in volume 2 of the *Quartus II Handbook*.
- To run the Quartus II software using a network (multiuser) license, make sure that the license server uses version 10.8 or later of the FLEXlm license manager server software. By default, the 10.8 version of the FLEXlm software is installed on a user workstation during a Quartus II software installation. For more information, refer to """Upgrading or Setting Up a License Manager Server" on page 2–14.

Downloading and Installing Software with the Altera Installer

Follow these steps to download and install software with the Altera Installer:

1. Verify that you have sufficient free disk space to contain copies of uncompressed versions of the software files.
2. Launch the Altera Installer from the Download Center of the Altera website.
3. Click **Run** in the **File Download** dialog box. The Altera Installer guides you through the download and installation process.

More Download, Installation, and Setup Procedures

In addition to the procedures described in this manual, you can perform the following download, installation, and procedures for Altera software:

- Downloading and installing individual software and components—you can download and install individual software and components, including device support, from the Download Center of the Altera website.
- Downloading and installing software separately—you can download Altera software installation files from the Download Center of the Altera website and save them locally for installation on one or more computers at a later time.
- Installing software at the command line—you can install Altera software at the command line with a custom installation script using command-line arguments.
- Installing software with the Altera Complete Design Suite DVDs—you can install Altera software with the Altera Complete Design Suite DVDs, which are available by request.
- Installing software with Windows self-extracting installers or Linux stand-alone installers—you can install Altera software for Windows with self-extracting installers using optional command-line arguments. You can use the available command-line arguments to test, analyze, or direct extracted output files. For Linux, you can install Altera software with stand-alone installers by manually uncompressing and extracting your installation files to your local computer drive.
- Mounting and unmounting the Altera Complete Design Suite DVDs—you can mount and unmount the Altera Complete Design Suite DVDs on Linux workstations if your Linux operating system does not automatically mount DVDs inserted into your DVD drive.
- Setting up the Quartus II software with a JTAG server on a network—you can set up the Quartus II software to allow the JTAG server to run JTAG services, which is necessary if you install the Quartus II software for Windows on a network drive and have a JTAG server.

For detailed instructions for these download, installation and setup procedures, refer to *About Installing Altera Software* in Quartus II Help.

If you do not already have the TCP/IP protocol installed on the computers running Windows in your network, you must add it to your networking configuration.

For more information about installing the TCP/IP protocol on PCs running Windows, refer to Windows documentation or to the Microsoft website.

Using the 64-bit Version of the Quartus II Software for Linux

If your project requires addressability of computer memory greater than 4 GB, you can use the 64-bit version of the Quartus II software for Linux. Compiling designs with the 64-bit version of the Quartus II software requires more system memory and you may notice an increase in compilation times if there is not sufficient physical memory to accommodate the increased memory usage. You can mitigate this effect by increasing the total physical memory on the system.

The 64-bit version of the Quartus II software is installed automatically when you install the Quartus II software.

For more information about turning on 64-bit processing with the Quartus II software, refer to *Using the 64-bit Version of the Quartus II Software for Linux* in Quartus II Help.

Configuring the Linux User Environment

Perform the following steps for each user before starting the Quartus II software for Linux for the first time:

1. Update each user's `PATH` environment variable in the **.cshrc** file or **.bashrc** file, which is located in the home directory, to include the **bin** directory in the Quartus II system directory, which is usually the <*home directory*>**/altera/**<*version number*>**/quartus/bin** directory for Linux, where <*home directory*> is the default directory of your Linux workstation or as set by your system administrator.

   To update the `PATH` environment variable, type the following command at a command prompt:

   - C shell:
     `setenv PATH ${PATH}:/<Quartus II system directory>/bin ↵`
   - Bash shell:
     `export PATH=${PATH}:/<Quartus II system directory>/bin ↵`

   If you run the Quartus II software for Linux with a script, you can run the latest installed version of the Quartus II software with the **quartus** executable either by specifying the latest version of the Quartus II software, or the full path for the **quartus** executable in the `PATH` environment variable.

2. Review and update as appropriate, each user's `QUARTUS_ROOTDIR_OVERRIDE` environment variable, which specifies the name of the Quartus II system directory, and each user's Quartus II general environment variables, as described in "Quartus II General Environment Variables" on page 3–1.

3. If you are using the `LM_LICENSE_FILE` environment variable to specify your license file or license server address, modify the value of `LM_LICENSE_FILE` as described in "Setting the LM_LICENSE_FILE Environment Variable in the Linux Workstation C Shell Resource File (.cshrc)" on page 2–11.

4. Save the changes to the **.cshrc** file or **.bashrc** file, and then type the following at a command prompt:

   - C shell:
     `cd ↵`
     `source .cshrc ↵`
   - Bash shell:
     `cd ↵`
     `. ~/.bashrc ↵`

Starting the Quartus II Software

This section describes starting and licensing the Quartus II software. If the Quartus II software cannot detect a valid license file, you are prompted with licensing options, which are described in "Quartus II Software Evaluation Period" on page 2–3.

Starting the Quartus II Software in Windows

To start the Quartus II software, on the Windows Start menu, point to **Programs**, point to **Altera**, point to **Quartus II** <*version number*>, and then point to **Quartus II** <*version number*> **(32-bit)** or **Quartus II** < *version number*> **(64-bit)**.

or

Type the following command at a command prompt:

```
<drive>:\<Quartus II system directory>\bin<32 or 64>\quartus ↵
```

Starting the Quartus II Software in Linux

Start the Quartus II software for Linux by typing the following command at the command prompt:

`quartus` (32-bit)↵

or

`quartus --64bit` (64-bit)↵

Make sure you do not run the `quartus` command in the **/**<*Quartus II system directory*>**/linux** directory. If you start the Quartus II software in a platform-specific directory, the software may not function correctly. For more information about turning on 64-bit processing with the Quartus II software, refer to *Using the 64-bit Version of the Quartus II Software for Linux* in the Quartus II Help.

Programming Cable Drivers

You must install the appropriate programming cable drivers before you can use an Altera download cable or programming unit to program devices with the Quartus II software.

The programming cable drivers are located in the following directories:

- Windows: <*drive*>**:\altera**<*version number*>**\quartus\drivers**
- Linux: <*home directory*>**/altera** <*version number*> **/quartus/drivers**

For detailed programming cable driver information, including programming cable user guides, refer to the Cable & Adapter Drivers Information page.

2. Licensing Altera Software

This chapter describes Altera software licensing options and procedures. To set up your license for Altera software, follow these steps, which are described in detail in this chapter:

1. Select a licensing option, which are described in "Licensing Options" on page 2–1.
2. Obtain a licensing file, as described in "Obtaining a License File" on page 2–3.
3. Set up the license file, as described in "Setting Up the License File" on page 2–9.
4. If you have a network license, set up the FLEXlm license manager server, as described in "Upgrading or Setting Up a License Manager Server" on page 2–14.

Licensing Options

Altera provides licensing options for Altera software products, which are described in this section.

An Altera software subscription enables the Quartus II software (includes the IP MegaCore Library) and the ModelSim-Altera Edition software.

When you purchase a Quartus II software license, the license file supports the version of the Quartus II software you purchase, all previous versions, and all versions released within a year of the purchase date. You can use the version of the Quartus II software you purchase, and all related software, including the ModelSim-Altera Edition software and the MegaCore IP Library, indefinitely.

Supported Software Subscriptions

Altera offers the following types of software subscriptions for the Quartus II software:

- Fixed license—a stand-alone (node-locked, single-user) license tied to the network interface card (NIC) ID.
- Floating license—a floating network (multiuser) license for users running the Quartus II software on Windows PCs or Linux workstations. Floating licenses are not operating system-specific. You can purchase additional seats to add to your floating license after its original purchase.

Altera continues to support operating system-specific floating licenses for the Quartus II software version 6.1 and earlier.

You can find examples of license files in "License.dat Example Files" on page B–5.

The SOPC Builder and Qsys features are fully integrated into the Quartus II software and do not require separate license files. Components that are not available in the default installation of the SOPC Builder and Qsys software are included with the MegaCore IP Library.

The ModelSim-Altera Edition software is available for purchase and does not require a separate license file, however, you must specify your license file by following the

steps in "Specify the License for the ModelSim-Altera Edition Software" on page 2–13.

Intellectual Property (IP) Cores

The MegaCore IP Library, which allows you to use the OpenCore or OpenCore Plus evaluation of Altera IP cores, is automatically installed with the Quartus II software. Third-party IP cores are delivered by the partner for evaluation with the appropriate license.

You must have a full license for all Altera MegaCore soft IP or Nios II soft processor cores to generate programming files that you may use for an unlimited time. You can purchase a license through your local Altera sales office or distributor, and then download a license file from the Self-Service Licensing Center of the Altera website.

For more information about Intellectual Property (IP) Cores, refer to the Intellectual Property & Reference Designs page. For more information about OpenCore and OpenCore Plus IP evaluation programs, refer to *AN 320: OpenCore Plus Evaluation of Megafunctions* and *AN 343: OpenCore Evaluation of AMPP Megafunctions*.

Mentor Graphics AXI (Advanced eXtensible Interface) Verification IP Suite Altera Edition of Bus Functional Models (BFMs) and Inline Monitor for AXI3

If you require access to the Mentor Graphics AXI (Advanced eXtensible Interface) Verification IP Suite Altera Edition of Bus Functional Models (BFMs) and Inline Monitor for AXI3, and want to upgrade to the Quartus II Subscription Edition software version 12.0 from a previous version, you must regenerate your license file.

If you want to access Mentor Graphics AXI Verification IP Suite Altera Edition of BFMs and Inline Monitor for AXI3 with the Quartus II Web Edition software, you must upgrade to version 12.0 and purchase seat licenses by contacting your Altera sales representative.

You can generate and manage license files for the IP Suite and other Altera software and IP products, by visiting the Self-Service Licensing Center of the Altera website.

Development Kits Containing the Quartus II Software

Development kits that include the Quartus II software include instructions for obtaining a license for that software.

You can purchase development kits from the Development Kits, Daughter Cards & Programming Hardware page or through your local Altera sales office or distributor.

Non-Licensed Software

Altera offers the Quartus II Web Edition and ModelSim-Altera Starter Edition software as entry-level software that supports selected devices and provides limited feature support and does not require license files.

Altera University Program Software Licenses

The Altera University Program offers licensed Altera software to participating universities.

For more information, refer to the Altera University Program page of the Altera website.

Quartus II Software Evaluation Period

When you start the Quartus II software, if the software cannot detect a valid license file, a dialog box with the following options appears:

- **Buy the Quartus II Subscription Edition software**—launches your default Internet browser and displays the Buy Design Software page of the Altera website, where you can view and purchase Altera software options.
- **Start the 30-day evaluation period with no license file**—allows you to use the Quartus II software for 30 days without programming file support
- **Perform automatic web license retrieval**—for fixed licenses, this option allows the Quartus II software to automatically retrieve the license file from the Altera website. Refer to "Obtaining a License File" on page 2–6 for more information.
- **If you have a valid license file, specify the location of your license file**—displays the **License Setup** page of the **Options** dialog box, where you can specify the location of your license file. Refer to "Setting Up the License File" on page 2–9 for more information.

Obtaining a License File

This section describes how to obtain an Altera **license.dat** license file. Altera license file types and their requirements are described in Table 2–1.

Table 2–1. Required Information for Each License Type

License Type	Requirements
Fixed license	NIC ID or software guard ID for Windows PCs (1)
Floating license	NIC ID for Windows or Linux license servers Host ID for UNIX license servers
Intellectual Property (IP) and Development Kit License	Variable (2)

Notes:

(1) Software guards are supported for the Quartus II software version 7.2 and earlier.

(2) Because Intellectual Property (IP) and development kit licenses are added as feature lines in the Quartus II software license file, the licensing requirements depend on the Quartus II software license type.

Licensing Requirements

You can obtain a **license.dat** file from the Self-Service Licensing Center of the Altera website with the information described in this section.

If you want to obtain a license file for Altera software or IP with an expiration date prior to January 1, 2009, visit the Legacy License Generator page.

NIC ID

A Network Interface Card (NIC) ID is a 12-digit hexadecimal string embedded in the

network card that uniquely identifies the PC where the software or license server is installed.

- To find your Windows NIC ID using FLEXlm utilities, type the following command at a command prompt:

  ```
  <drive>:<Quartus II system directory>\bin\lmutil lmhostid ↵
  ```

- To find your Windows NIC ID, which is the physical address of your ethernet device, type the following command at a command prompt:

  ```
  ipconfig /all↵
  ```

  In the output of the command, the NIC ID is the physical address without the dashes. If your PC has more than one network card, you can use the NIC ID of any network card connected to the computer that is turned on when the Quartus II software is in use.

You can use the FLEXlm licensing scheme to configure up to three redundant license servers. The first server specified is the master. Use the master server's NIC ID or host ID when obtaining a license.

- To find your Linux NIC ID, type the following command at a command prompt:

  ```
  /sbin/ifconfig eth0 ↵
  ```

  In the output of the command, the NIC ID is the ID to the right of **HWaddr**, without the colons.

- To find your NIC ID if the Quartus II software is installed on your computer, on the Tools menu, click **License Setup**. Your NIC ID appears under **Local System info** in the **Network Interface Card (NIC) ID** field.

Hard-Disk Serial Number

A hard-disk serial number is an eight-character hexadecimal ID that identifies the PC with the Altera license. If the ID is not eight characters, include a leading zero.

- To find the hard-disk serial number on a Windows PC, type the following command at a command prompt:

  ```
  vol c: ↵
  ```

  In the output of the command, the hard-disk serial number is the volume serial number.

- To find the hard-disk serial number if the Quartus II software is installed on your computer, on the Tools menu, click **License Setup**. The hard-disk serial number appears under **Local Systems info** in the **C: drive serial number** field. Verifying the hard-disk serial number with the Quartus II software ensures that you use the correct hard-disk serial number if your PC has multiple hard drives.

UNIX Host ID

The license server host ID is an eight-digit hexadecimal number, which identifies the UNIX workstation that serves Quartus II software licenses.

The license server host ID for UNIX is equivalent to the NIC ID. Refer to "NIC ID" on page 2–3.

Sentinel Software Guard ID

If you have a fixed license for the Quartus II software for Windows version 7.2 or earlier, you must use a software guard to license the software. A software guard ID is a ten-character alphanumeric number beginning with the letter T.

You can find the software guard ID on the printed label on the guard, or if the Quartus II software is installed and the guard is attached, on the **License Setup** dialog box from the Tools menu. Your software guard ID appears under **Local System info** in the **Software Guard ID** field.

Requesting a License File

You can direct the Quartus II software to automatically retrieve a license file, or you can manually request a license file from the Self-Service Licensing Center of the Altera website. You can also view more licensing information on the Altera Licensing page.

If you want to obtain a license file for Altera software or IP with an expiration date prior to January 1, 2009, visit the Legacy License Generator page.

To obtain a license file, follow these steps:

1. Start the Quartus II software as described in the "Starting the Quartus II Software" on page 1–8.
2. Select **Perform automatic web license retrieval** to request a license file automatically from the Altera website.

   or

   To manually request a license file, use the procedures in "Self-Service Licensing Center" on page 2–6. If you have a triple redundant license server, you must manually request a license file.

   If the Quartus II software is able to retrieve a fixed license file successfully from the Altera website, you can skip the remaining steps of this procedure. If not, you are guided through the licensing procedure.
3. You will receive an email from Altera with the license file text and an attached file. Use the attached license file if you have a fixed license. If you have a floating license, you must edit the attached license file to update the <*hostname*>, <*port number*> and <*path to daemon executable*>. If you have a **license.dat** file for both the Quartus II and MAX+PLUS II software, save the **license.dat** file in a top-level directory named <*drive*>**:\flexlm**.

   If you do not receive an email from Altera within 12 hours of requesting a license, or if you do not know all the required information to complete the process, file a service request at mySupport section of the Altera website.

   The FLEXlm licensing scheme allows you to set up three redundant license servers to serve a floating license. You can request a license file for redundant servers from the Self-Service Licensing Center.
4. Set up your license file with procedures in "Setting Up the License File" on page 2–9.

Self-Service Licensing Center

The Self-Service Licensing Center is an online licensing center that allows you to view, obtain, activate, and manage your Altera software licenses. You can perform the following tasks with the Self-Service Licensing Center:

- Obtain license files—you can obtain license files for your existing and new licenses. For more information, refer to "Obtaining a License File" on page 2–6.
- View existing licenses—you can view all of your existing licenses, including their expiration dates, available rehosts, and licensed users.
- Renew licenses—you can renew your existing licenses. For more information, refer to "Renewing a License" on page 2–8.
- Rehost licenses—you can transfer your existing licenses from one computer to another. You have a total of three rehosts for each license. For more information, refer to "Rehosting a License" on page 2–8.
- Activate a new license—you can activate new licenses after purchase. For more information, refer to "Activating a License" on page 2–9.
- Add seats to a floating license—you can add seats to your existing floating licenses. For more information, refer to "Adding Floating Seats" on page 2–8.
- Manage license users—you can specify the licensed user for each of your existing licenses. For more information, refer to "Managing Licensed Users" on page 2–9.
- View license history—you can view the license file history for each computer that you add to your myAltera account.

Additionally, you can also split a floating license, obtain a checkout license, or obtain a companion license with the Self-Service Licensing Center.

For more information about additional licensing procedures, refer to *Using the Self-Service Licensing Center* in Quartus II Help.

You can access the Self-Service Licensing Center from the Altera Licensing page, the mySupport page, or from the Download Center. You must have a myAltera account to access the Self-Service Licensing Center.

For more information about myAltera accounts, visit the mySupport section of the Altera website.

Obtaining a License File

You can obtain a license file for an existing, new, or renewed license. If you want to obtain a license file for a new or renewed license, you must first activate or renew the license using the procedure in "Activating a License" on page 2–9 or "Renewing a License" on page 2–8 respectively.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Create New License**.
4. Select one or more licenses from the **My Software & IP Licenses** table, and then click **Assign Computer**.

5. On the Assign Computer page, select a computer from the **My Computers** table to which you want to assign your license, and then click **Get License**.

   Your license file is sent to the email address specified for your licensed user. If you have not specified an email address, your license file is sent to the email address in your myAltera account profile. Your software license type must match the license type of any license you want to assign your computer.

To add computers to your myAltera account profile, follow the procedure in "Creating a Computer Profile".

Creating a Computer Profile

You can create computer profiles for your myAltera account to which you can assign licenses.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Manage Computers**.
4. Click **Create New Computer** in the **Manage Computers** table.
5. Select the **License Type** for your computer. Your software license type must match the license type of any license you want to assign your computer.
6. Select the **Primary Computer Type** for your computer. The primary computer type is the NIC ID, Host ID, or software guard ID. For more information, refer to "Licensing Requirements" on page 2–3.
7. Type your computer name in the **Primary Computer Name** box. You can specify any name meaningful to you in this box.
8. Type your NIC ID, Host ID, or software guard ID number in the **Primary Computer ID** box.
9. If you have a fixed license and want to use your license for multiple computers, you can specify up to two companion IDs in the **Companion ID** and **Companion ID 2** boxes. Your companion ID is your NIC ID, Host ID, or software guard ID. You can use your license, or associated companion license, on only one computer at a time.
10. If you have a floating license, you can set up your license on up to three redundant license servers. Type the NIC ID or Host ID for redundant servers in the **Redundant Server ID 2** and **Redundant Server ID 3** boxes.
11. Click **Save**.
12. To edit an existing computer, follow these steps:
    a. Click the edit icon next to the computer that you want to edit in the **Manage Computers** table.
    b. Make changes in the Manage Computers page.
    c. Click **Update** when you are finished making changes.

Rehosting a License

You can rehost, or transfer, a license from one computer to another. You can rehost each license up to three times.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Create New License** to access the Create New License page.
4. Select one or more licenses from the **My Software & IP Licenses** table, and then click **Assign Computer**.
5. On the Assign Computer page, select a computer from the **My Computers** table to which you want to rehost your license, and then click **Get License**.

   Your license file is sent to the email address specified for your licensed user. If you have not specified an email address, your license file is sent to the email address in your myAltera account profile. Your software license type must match the license type of any license you want to assign your computer.

If you do not have any computers listed in the **My Computers** table, you can add computers with the procedure in "Creating a Computer Profile" on page 2–7.

Adding Floating Seats

You can add floating seats to an existing floating license to increase the number of users available. Adding additional seats to an existing floating license may affect its maintenance expiration date.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Add Floating Seats**.
4. On the Add Floating Seats page, click **Add Seats** next to the additional seats in the **Additional Floating Seat Products** table that you want to add to an existing floating license.
5. On the Add Floating Seats - Select Product License page, click **Add Seats** next to the floating license in the **Select a Floating Server** table to which you want to add the additional seats.
6. On the Add Floating Seats - Select Seats page, type the number of additional seats you want to add to your floating license in the **How many seats do you want to add this time?** box.

   When you add additional seats to an existing floating license, the new maintenance subscription term of the floating license is calculated by adding the total number of maintenance months for the existing and new seats, and then dividing by the total number of seats. Any partial number is rounded up to the nearest whole number.

   For example, if you have an existing floating license with ten seats that expires in five months and you purchase two additional seats, your updated floating license maintenance subscription would expire in seven months for all twelve seats.

Renewing a License

You can renew an existing license with the Self-Service Licensing Center. You must first purchase your license renewal, for example, from the Buy Design Software page of the Altera website, before applying a renewal.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Apply Renewals** to access the Apply Renewals page.
4. Click **Apply Renewal** for the license you want to renew in the **My Renewals** table.

Activating a License

You can activate a new license with the Self-Service Licensing Center. You must first purchase your new license, for example, from the Buy Design Software page of the Altera website, before activating the new license.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Activate Products** to access the Activate Products page.
4. Type your license activation code or Quartus II software serial number in the **License Activation Code** box.
5. Click **Go**.
6. Select the products that you want to activate in the **Activate Products** table.
7. Click **Activate**.

Managing Licensed Users

You can assign or change users for your existing licenses. Licensed users are granted access to their assigned licenses.

1. Log on to your myAltera account from the Altera website.
2. Access the Self-Service Licensing Center.
3. Click **Manage Users** to access the Manage Users page.
4. Select one or more licenses from the **My Software & IP Licenses** table, and then click **Assign User.**
5. On the Add A Licensed User page, type the name and email address of the licensed user.
6. Click **Assign User**. The licensed user receives an email notifying them that they have been added as a licensed user and now have access to the specific license that they have been assigned.

Setting Up the License File

You must modify the **license.dat** file for your specific licensing options. Use the procedures in this section to modify your license file.

License File Conditions

If you modify the **license.dat** file, ensure that the following conditions are met:

- The text editor does not append **.txt** or any other file extension to the file name, for example **license.dat.txt**.
- A carriage return (new line) is present at the end of the last `FEATURE` line.
- Any `FEATURE` line that wraps to a second or third line contains a backslash (\) at the end of each line to indicate that it continues. However; there is no backslash (\) at the end of the lines if the `VENDOR_STRING` line wraps to multiple lines. The backslash should only be added outside the line with double quotation marks (").
- If you are using a 64-bit version of the Quartus II software, ensure a space exists between the closing double quotation mark(") and backslash (\) at the end of the `VENDOR_STRING` line.
- No hidden control characters exist in the license file.
  - If you open the license file with any software other than a plain text editor, the software may add hidden characters. For example, WYSIWYG editors such as Microsoft Excel, Word, or WordPad, may insert special control characters such as a tab or carriage return. If special control characters are pasted into another plain text document, the license file can be corrupted by characters that may not be visible in a plain text editor.
  - If you edit the license file in one operating system, copy the license file in another operating system, and then copy the license file to the Windows operating system, the second operating system may insert unwanted control characters into the license file if you do not correctly convert the file.

Setting Up a Fixed License

To set up a fixed license file, follow these steps:

1. Make a backup copy of any existing **license.dat** file for reference.
2. Save the new **license.dat** file on your local hard drive. You should save and use the **license.dat** file attached to the licensing email you received from Altera.
3. If you are using the Quartus II software version 7.2 or earlier, attach the software guard to a parallel or USB port on your computer.

   For more information about Sentinel drivers, refer to "Installing a Sentinel Software Guard" on page 2–17.
4. After you save the **license.dat** file on your local hard drive, proceed to one of the following procedures to specify your license. Each procedure provides an alternative method to set up your license file.
   - "Specifying the License File with the LM_LICENSE_FILE Environment Variable"
   - "Specifying the License File within the Quartus II Software" on page 2–12

Setting Up a Floating Network License

This section describes how to set up a floating license. For instructions about how to set up a floating license server (typically performed by a system administrator), refer to "Setting Up Floating Network Licenses on the License Server" on page 2–12.

To set up a floating license, follow these steps:

1. Obtain the port number and host name from the network or system administrator. This information can also be found in the license file line beginning with `SERVER`.

   `SERVER` <*hostname*> <*8 or 12 character host or NIC ID*> <*port*>

   The license location for the user is <*port*>@<*hostname*>. If a port is not listed in the **license.dat** file, specify @<*hostname*>.

2. After you obtain the port number and host name, proceed to one of the following procedures to set up your license. Each procedure provides an alternative method to set up your license file.

   - "Specifying the License File with the LM_LICENSE_FILE Environment Variable"
   - "Specifying the License File within the Quartus II Software"

Specifying the License File with the LM_LICENSE_FILE Environment Variable

Altera recommends specifying the Quartus II software license location with the `LM_LICENSE_FILE` environment variable. Additionally, third-party tools provided by Altera require that you specify the license location with the `LM_LICENSE_FILE` environment variable.

The license file specification in the **License Setup** dialog box supersedes the `LM_LICENSE_FILE` environment variable setting.

The Quartus II software does not support the <*vendor daemon*>`_LICENSE_FILE` environment variable.

Setting the LM_LICENSE_FILE Environment Variable in the Windows Control Panel

You can specify the location of your license file outside the Quartus II software for Windows by setting system variables in the Windows System Control Panel.

Setting the LM_LICENSE_FILE Environment Variable in the Linux Workstation C Shell Resource File (.cshrc)

To specify the license file on each client (user) workstation, make sure that you update the `LM_LICENSE_FILE` environment variable that is specified in the **.cshrc** file located in each user's home directory.

For more information about setting the `LM_LICENSE_FILE` environment variable in the Windows Control Panel or the Linux Workstation C Shell Resource File (**.cshrc**), refer to *Setting the LM_LICENSE_FILE Environment Variable* in Quartus II Help.

Specifying the License File within the Quartus II Software

You can also specify a fixed or floating license file within the Quartus II software.

For more information about specifying the license file within the Quartus II software, refer to *Specifying the License File within the Quartus II Software* in Quartus II Help.

Setting Up Floating Network Licenses on the License Server

Setting up a floating network license server is typically performed by a system administrator. You can set up a floating network license on a Windows, Solaris, or Linux license server using the FLEXlm license manager software provided by Altera.

Altera software uses the FLEXlm software to administer licensing for single or multiple users in a network installation. Follow the procedure in "Modifying the Network License File" on page 2–12 to modify the license file, and then set up and start the FLEXlm license manager.

For more information about setting up floating network licenses on the license server, refer to *Setting Up Floating Network Licenses on the License Server* in Quartus II Help.

Modifying the Network License File

The **license.dat** file must be modified before it can be used by the license server.

To modify and save the license file, in the **license.dat** file, type the variables that are described in Table 2–2. The host or NIC ID is already entered in the license file.

Table 2–2. Variables to Modify in the License File (license.dat)

Variable Name	Description
<host name>	The host name of the server; for example, `my_server`.
<port number> (1)	The port number for the license manager service on the server; for example, `1800`. The port number is optional and should be outside of the 27000-28000 range and be unique on the machine.
`alterad` "*<path to daemon executable>*" (2) (3)	Path to the Altera vendor daemon executable alterad. ■ *<Quartus II system directory>*`\bin\alterad.exe` (Windows) ■ /*<Quartus II system directory>*`/linux/alterad` (Linux) ■ /*<Quartus II system directory>*`/solaris/alterad` (Solaris) (5)
`mgcld` "*<path to daemon executable>*" (2) (3) (4)	Path to the Mentor Graphics vendor daemon executable mgcld. ■ *<ModelSim-Altera system directory>*`\win32aolem\mgcld.exe` (Windows) ■ /*<ModelSim-Altera system directory>*`/linuxaloem/mgcld` (Linux) ■ /*<ModelSim-Altera system directory>*`/sunos5aloem/mgcld` (Solaris) (5)

Notes:

(1) If you do not specify a port number, the FLEXlm license manager automatically chooses a free port between 27000 and 27009.

(2) If the license server does not provide the necessary vendor daemon, copy the required daemon from another machine, save the file in a location on the license server, and specify the daemon location on the license server in the license file.

(3) If the server path has spaces in it, enclose the full path in quotation marks.

(4) If you are not using a license file for the ModelSim-Altera software, you may delete this line.

(5) Quartus II software versions 8.0 and later do not support the Sun Solaris operating system. However, Altera software does support Sun Solaris license servers.

When you complete all modifications, ensure the conditions described in"License File Conditions" on page 2–10 are met.

Specify the License for the ModelSim-Altera Edition Software

The ModelSim-Altera Starter Edition software versions 6.4g and later do not require a license.

The ModelSim-Altera Edition software supports licenses using the Mentor Graphics license daemon **mgcld**. You can find the **mgcld** daemon in the following directories:

- Windows: <*ModelSim-Altera system directory*>**\win32aloem**
- Linux: <*ModelSim-Altera installation directory*>**/linuxaloem**

  or

  <*Quartus II system directory*>**/linux/linuxaloem** (when installed using the Altera Complete Design Suite for Linux DVDs)

Before starting the ModelSim-Altera software, set the `MGCLD_LICENSE_FILE` environment variable to the location and file name of the ModelSim-Altera license file. For example, `MGCLD_LICENSE_FILE` (<*ModelSim-Altera installation directory*>**/licenses/eda/license.dat**) or with the <*port*>@<*hostname*> notation **(1900@set)**, where <*port*> is the license port number and <*hostname*> is the server's host name as defined in the "Modifying the Network License File" on page 2–12.

To set the `LM_LICENSE_FILE` environment variable to the location and file name of the ModelSim-Altera license file for Windows or Linux, refer to "Specifying the License File with the LM_LICENSE_FILE Environment Variable" on page 2–11.

The ModelSim-Altera Edition software license expires 15 months after the date of purchase, at which point you can no longer use the software. You must obtain an updated Quartus II software subscription license file from the Self-Service Licensing Center every 15 months to renew your license for the specific ModelSim-Altera Edition software version that you purchase. You can use only the version of ModelSim-Altera Edition software that you purchase with the updated license.

Licensing for the Nios II Embedded Design Suite

You can create, compile, and generate time-limited FPGA programming files for Nios II hardware systems without obtaining a license file. To generate non-time-limited FPGA programming files and flash programming files, you must obtain a license for the Nios II processor core or Nios II development kit, in addition to the license for the Quartus II software. You do not need a license to develop software using only the Nios II Software Build Tools for Eclipse.

Transferring a License File

If you want to transfer your license file to another computer, you can rehost your license. Refer to the procedure in"Rehosting a License" on page 2–8.

Upgrading or Setting Up a License Manager Server

The Quartus II software uses the FLEXlm license manager software to administer licensing for single or multiple users in a network installation. This section provides instructions for upgrading and setting up the FLEXlm server software for Windows and instructions for configuring network licensing for Linux.

Quartus II software versions 8.0 and later do not support the Solaris operating system. However, Altera software does support Solaris license servers.

A system administrator should perform these steps to configure license servers after the Quartus II software is installed.

Upgrading the FLEXlm License Manager Server Software

To support network licensing, the Quartus II software requires the FLEXlm license manager server software version 10.8 or later. The Altera Installer for Windows installs the FLEXlm software version 10.8 on Windows 32-bit systems or version 11.1.1 on Windows 64-bit systems. The Altera Installer for Linux automatically installs version 10.8 of the FLEXlm software on Linux workstations. However, you should also verify that the FLEXlm software version of the license server is 10.8 or later.

Refer to "Downloading and Installing Altera Software" on page 1–4 for more information about installing the FLEXlm software. If the FLEXlm software is version 10.8 or later, skip to "Rereading an Existing License File" on page 2–15.

To determine which version of the FLEXlm software you are using, on the computer running the FLEXlm software, type the following commands at a command prompt:

- Windows:

  ```
  <FLEXlm system directory>\lmgrd -v ↵
  <FLEXlm system directory>\alterad -v ↵
  ```

- Linux or Solaris:

  ```
  /<FLEXlm system directory>/lmgrd -v ↵
  /<FLEXlm system directory>/alterad -v ↵
  ```

If the **lmgrd** or **alterad** daemons are not from the FLEXlm software version 10.8 or later, you must upgrade both daemons with the versions provided with the Quartus II software.

For more information about upgrading an older version of the FLEXlm software, refer to *Upgrading or Setting Up a License Manager Server* in Quartus II Help.

Configuring a New License Server

The Quartus II software uses the FLEXlm license manager server software to administer licensing for single or multiple users in a network installation. If you do not have an existing FLEXlm license server, you must configure a new license server before starting the Quartus II software for the first time.

For more information about configuring a new license server, refer to *Upgrading or Setting Up a License Manager Server* in Quartus II Help.

Rereading an Existing License File

If you change the license file, you must reread the license file or restart the license server before you can run the Quartus II software again. If you have an existing FLEXlm license server with an existing license file for the MAX+PLUS II software, or software from another vendor, and the FLEXlm license manager server software is version 10.8 or later, you can copy and paste the Altera `FEATURE` lines from your Quartus II **license.dat** file into your existing license file. Make sure you modify the license file according to the guidelines in "Setting Up the License File" on page 2–9.

Refer to "Upgrading or Setting Up a License Manager Server" on page 2–14 to verify that you are using the latest supported version of the FLEXlm software.

If you do not have an existing FLEXlm license server, or you need to configure a new license server, go to "Configuring a New License Server" on page 2–14.

- To reread your license file on a license server for Windows, type the following command at a command prompt:

  `<Quartus II system directory>\bin\lmutil lmreread` ↵

  or

  Follow these steps:

  a. In the **LMTOOLS** dialog box, click **Configuration using Services**.

  b. Select the name of the license server, usually **Flexlm License Server**.

  c. Click the **Start/Stop/Reread** tab.

  d. Click **ReRead License File**.

- To reread your license file on a license server for Linux or Solaris, type the following command at a command prompt:

  `<Quartus II system directory>/<operating system>/lmutil lmreread` ↵

  Where `<operating system>` is `linux` or `solaris`.

  or

  Restart the license server.

Type `lmgrd -help` at a command prompt to see a list and description of the available FLEXlm options.

Starting and Stopping the License Server

When configuring the license server, you can start and stop the license server with the **LMTOOLS** dialog box. Before you start or stop the license server, you must configure a new license server as a Windows service. Refer to "Configuring a New License Server" on page 2–14 for more information.

To start or stop the license server with the **LMTOOLS** dialog box, follow these steps:

1. Type the following command at a command prompt:

   <Quartus II system directory>\bin\lmtools ↵

2. In the **LMTOOLS** dialog box, click **Configuration using Services**.
3. Select the name of the license server, usually **Flexlm License Server**.
4. Click the **Start/Stop/Reread** tab.
5. Click **Start Server** or **Stop Server**.

Starting the License Server Automatically at Startup

When configuring the license server, you can set up the license server to start automatically at startup with the **LMTOOLS** dialog box. You must configure a new license server as a Windows service before you set up the license server to start automatically at startup. Refer to "Configuring a New License Server" on page 2–14 for more information.

To start the license server automatically at startup with the **LMTOOLS** dialog box, follow these steps:

1. Type the following command at a command prompt:

   <Quartus II system directory>\bin\lmtools ↵

2. In the **LMTOOLS** dialog box, click **Configuration using Services**.
3. Select the name of the license server, usually **Flexlm License Server**.
4. Click the **Config Services** tab.
5. Turn on **Use Services**.
6. Turn on **Start Server at Power Up**.

Installing the FLEXlm License Manager Server Software on Another License Server

To install the FLEXlm license manager server software on an additional license server, follow these steps:

1. Create one of the following directories on the additional license server.
   - Windows: <*Quartus II system directory*>\
   - Linux or Solaris: <*Quartus II system directory*>/<*operating system*>

   Where <*operating system*> is **linux** or **solaris**.
2. Copy the following files from the <*Quartus II system directory*>\, <*Quartus II system directory*>**/linux,** or <*Quartus II system directory*>/**solaris d**irectory of your original Quartus II software into the new directory:
   - lmgrd
   - lmutil
   - alterad
   - lmtools (Windows)

You can also install the FLEXlm software on another license server with the **Install** button next to **FLEXlm Server** in the Altera Complete Design Suite DVDs setup program. Refer to "More Download, Installation, and Setup Procedures" on page 1–6 for more information.

Installing a Sentinel Software Guard

If your installation of the Quartus II software for Windows uses a node-locked (single-user) fixed license and includes a Sentinel software guard, you must install the Sentinel driver and software guard before you specify a license file.

The Sentinel driver is required for all computers running the Quartus II software for Windows that use a USB software guard. The Sentinel driver is installed automatically with the Quartus II software for Windows.

If you want to use a USB software guard with the 64-bit version of the Quartus II software for Windows, and you want to run the Quartus II software with Remote Desktop Connection, you must set up the software guard specifically for this function.

For more information about installing sentinel software guards, refer to *Installing a Sentinel Software Guard* in Quartus II Help.

3. Quartus II Environment Variables

The Quartus II software installation process initializes general and NativeLink environment variables. Some of these environment variables are described in this chapter.

Setting Linux Environment Variables

Depending on your shell type, you can find environment variables in the directories listed in Table 3–1. Set your environment variables with the shell type specific format.

Table 3–1. Environment Variable Location and Format

Shell	Location	Format
C	**.cshrc** file	`setenv <environment variable> <value>`
Bourne or Korn	**.profile** file	`set <environment variable> = <value>`
Bash	**.bashrc** file	`export <environment variable> = <value>`

Setting Windows Environment Variables

To set environment variables in Windows, follow these steps:

1. Click **Control Panel** on the Windows Start menu.
2. Double-click the **System** icon in the Control Panel window.
3. Click the **Advanced** tab in the **System Properties** dialog box.
4. Click **Environment Variables**.
5. Select a variable in the **Environment Variables** dialog box.
6. Click **Edit**.
7. Type a value in the **Variable value** box in the **Edit Variable** dialog box.

Quartus II General Environment Variables

The Quartus II software installation process initializes the following variables, but you can edit them to optimize your system performance.

- QUARTUS_ROOTDIR_OVERRIDE—The `QUARTUS_ROOTDIR_OVERRIDE` environment variable specifies the name of the Quartus II system directory. The default directory is *<home directory>* **/altera** *<version number>* (Linux) or *<Quartus II system directory>***\altera** *<version number>***\quartus** (Windows).

  If the system displays an error message indicating that Quartus II software files cannot be found when you start the program, you should set the `QUARTUS_ROOTDIR_OVERRIDE` environment variable to the name of the Quartus II system directory.

- QUARTUS_64BIT—The `QUARTUS_64BIT` environment variable specifies the 64-bit version of the Quartus II software for Linux. To turn on 64-bit processing in the Quartus II software for Linux, set the environment variable to 1 before running the Quartus II software. This environment variable is supported only by Linux systems with 64-bit processing.
- QUARTUS_LIBRARY_PATHS—The `QUARTUS_LIBRARY_PATHS` environment variable specifies user-defined library paths. You can use this environment variable to define multiple library paths at the same time instead of individually adding each path to the user library.

Quartus II NativeLink Environment Variables

The Quartus II software installation process initializes the following environment variables.

- QUARTUS_INIT_PATH—The `QUARTUS_INIT_PATH` environment variable specifies the paths of the other EDA tools launched from within the Quartus II software. You must set this environment variable to launch other EDA tools from within the Quartus II software.
- QUARTUS_INIT_LIBPATH—The `QUARTUS_INIT_LIBPATH` environment variable specifies the `LD_LIBRARY_PATH` variable required by some EDA tools. You should set this environment variable to the EDA tool's `LD_LIBRARY_PATH` variable if the EDA tool requires an `LD_LIBRARY_PATH` environment variable.

A. Altera Software File Organization

During the Altera software installation, the top-level directory, **\altera**<*version number*> (Windows) or <*home directory*>**/altera**<*version number*> (Linux) is created. The directory contains system software and data files and includes the subdirectories shown in this appendix.

The main **\altera**<*version number*> (Windows) or <*home directory*>**/altera**<*version number*> (Linux) directory includes the subdirectories and data files shown in Figure A–1 and Figure A–2. The **installer** directory is present only if you install Altera software with the Altera Installer. The **modelsim_ae** directory is present if you install the ModelSim-Altera Edition software. A **modelsim_ase** directory is present if you install the ModelSim-Altera Starter Edition software.

Figure A–1. Windows Altera Software Directory (*<drive>*:\altera*<version number>*)

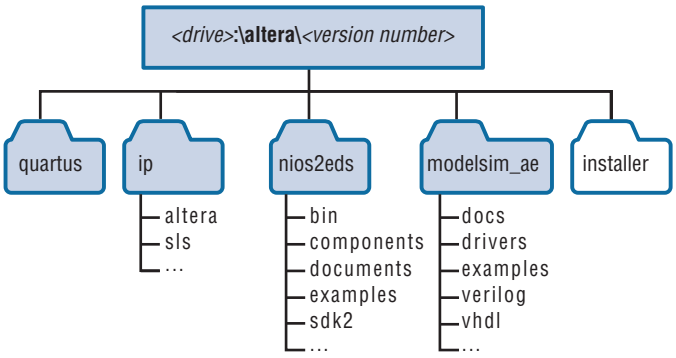
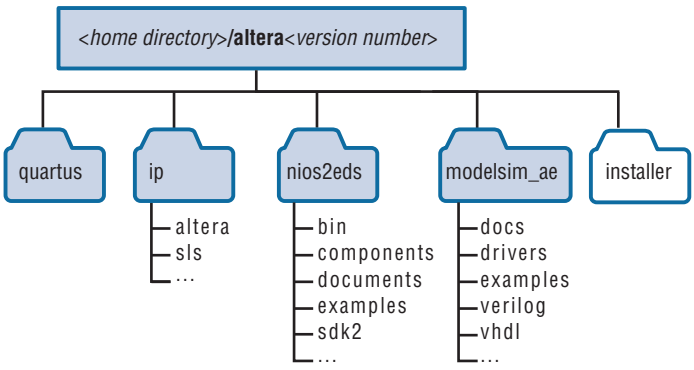


Figure A–2. Linux Altera Software Directory (*<home directory>*/altera*<version number>*)



The Quartus II software directory, **\altera**<*version number*>**\quartus** (Windows) or <*home directory*>**/altera**<*version number*>**/quartus** (Linux) includes the subdirectories shown in Figure A–3 and Figure A–4.

Figure A–3. Windows Quartus II Software Directory (*<drive>*:\altera*<version number>*\quartus)

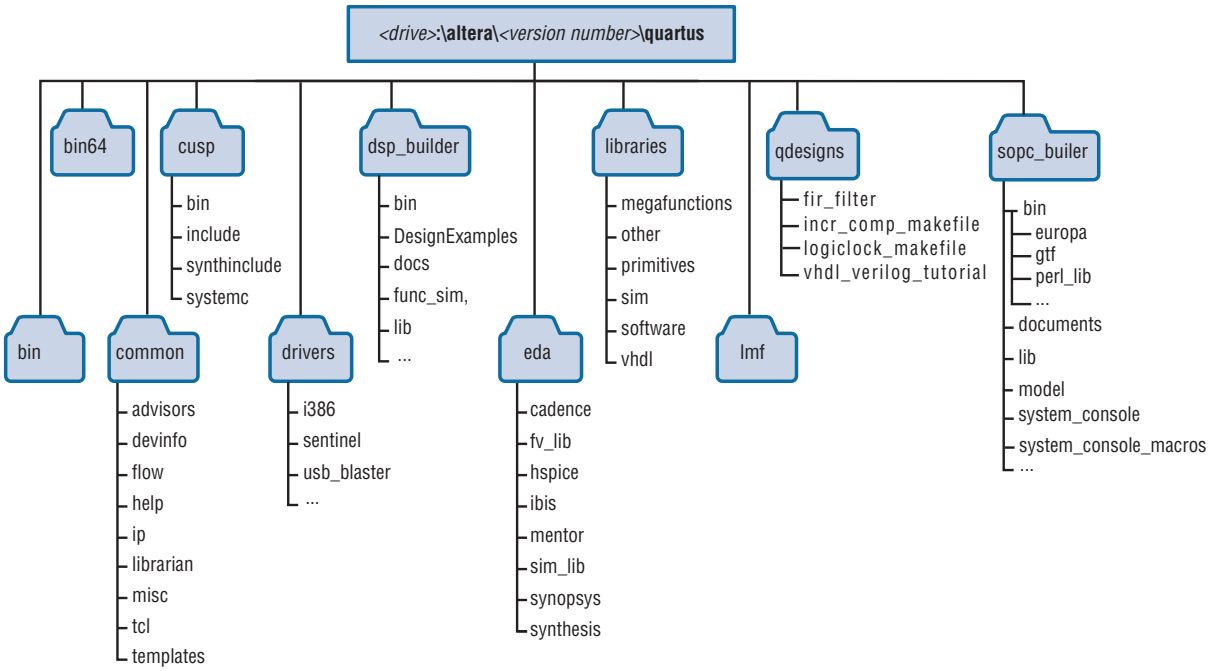
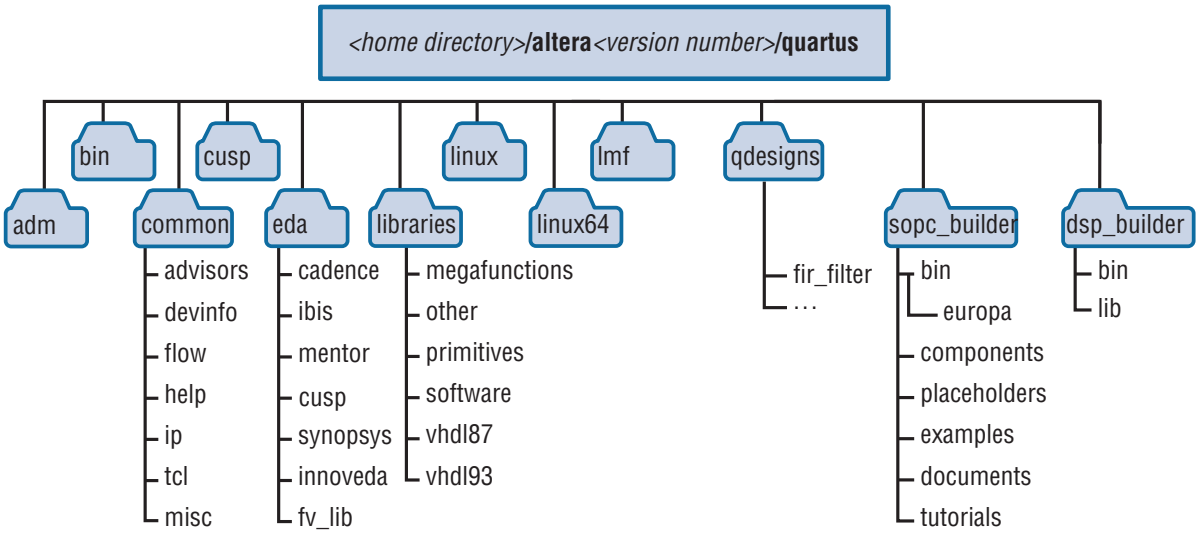


Figure A–4. Linux Quartus II Software Directory (*<home directory>*/altera*<version number>*/quartus)



B. License File Description and Examples

This appendix includes detailed information about Altera license file formats. If you have trouble modifying your license file, you can use the information in this appendix for troubleshooting.

For more information about license file troubleshooting and frequently asked questions about Altera software licensing, refer to *License File Troubleshooting* and *Licensing Frequently Asked Questions* and in Quartus II Help.

For more information about licensing, use the Software Licensing Troubleshooter available in the Support Center at the Altera website or visit the Altera Licensing page.

License File Components

This section describes the different parts of the Altera license file (**license.dat)**.

License File Header

Altera license files have headers that contain identifying information specific to the license, such as the type of license, the primary computer and companion IDs, issue and expiration dates, and a product license summary.

Figure B–1 shows the header of a fixed license file that contains a license for the Quartus II software and the ModelSim-Altera Edition software. This license file works on a PC that has software guard number T000012345 attached to its parallel port. The license was issued on May 13, 2010, is a perpetual license with no defined companion IDs, and a maintenance expiration date of April 2011.

Figure B–1. License Header Example

```
# Altera Corporation Software and/or Intellectual Property License File
# Issued 13 May 2010
# Perpetual-No License Expiration
# Upgrade to these products will no longer be available after the
# Maintenance Expiration date unless licenses are renewed.
# Fixed Node License
# Primary Machine Name-scenario 1
# Primary Machine ID-Guard ID T000012345
# Companion ID-N/A
# Companion ID 2-N/A
# Product License Summary:
# - ModelSim-Altera Edition Software, 1 Seat(s)
# Maintenance Expiration of 2011.04
```

SERVER, VENDOR, and USE_SERVER Lines

A floating license file starts with SERVER, VENDOR, and USE_SERVER lines to describe the license server. Fixed license files do not contain these entries. These license lines are structured as shown in the following example:

SERVER <*hostname*> <*8 or 12 character host or NIC ID*> <*port*>

VENDOR <*daemon*> <*path*>

USE_SERVER

The USE_SERVER line designates the license file as a floating license.

You can configure up to three redundant network license servers with the FLEXlm licensing scheme. In this case, there are three SERVER lines, one for each license server machine. The first server specified is the master.

Typically, a license file contains multiple VENDOR lines; one for each required license vendor daemon. Some license files might use the DAEMON keyword instead of VENDOR.

Table B–1 describes the elements of the SERVER and VENDOR license lines.

Table B–1. Elements of the SERVER and VENDOR Lines for Floating Licenses

Element Name	Editable	Description
hostname	yes	The host name of the server in the **license.dat** file.
8- or 12-character host or NIC ID	no	The PC NIC or UNIX Host ID of the server. You must supply this ID to Altera when purchasing the license.
port	n/a	The port number.
daemon	no	The vendor daemon name: ■ **alterad** daemon: Quartus II software ■ **mgcld** daemon: ModelSim-Altera software ■ **armlmd** daemon: ARM features of the ARM Development Suite (ADS)
path	yes	The path to the vendor daemon on the server. You must edit this entry.

FEATURE and INCREMENT Lines

All Altera license files contain FEATURE, and possibly INCREMENT lines, to describe the software features that are licensed by the **license.dat** file. Certain features use INCREMENT lines, which are structured similarly as FEATURE lines. The FEATURE line is structured as shown in the following example:

FEATURE <*name*> <*daemon*> <*version*> <*expiration*> <*# of licenses*> <*authcode*> *[<vendor_string>] [<hostid_lock>]* [*SIGN*] [*SUPERCEDE*] [<*issuer*>]

A backslash (\) character indicates that the FEATURE or INCREMENT line continues on the next line in the text file. The last line of each FEATURE line does not require the backslash. Elements in brackets [] are present only in some license FEATURE or INCREMENT lines. Figure B–2 shows a FEATURE line, followed by an INCREMENT line.

Figure B–2. FEATURE and INCREMENT Lines Example

```
FEATURE START
# The following is a feature line for Quartus II Subscription Edition Fixed
# Number of seat licenses is 1
# No license expiration date
FEATURE maxplus2 alterad 2011.04 permanent uncounted 6D103456930D \
HOSTID=GUARD_ID=T000012345 SIGN="0116 7EF5 F487 4771 3456 9278 \
4DA6 80CF 4131 95C6 1F1E D54F 8429 C807 6A8B 0A13 BC80 A11D 0F6E AC08 4FA8 0B6E C267\
9BBB 5791 C037 0FAD FB9E FFD8 5CF4"
FEATURE quartus alterad 2011.04 permanent uncounted 08E2123438D3 \
HOSTID=GUARD_ID=T000012345 TS_OK SIGN="0403 403E CF63 6460 \
3C3D 2AA7 60B3 A074 77A7 670A 3C5D BF03 9391 3476 D1DA 14E7 56FA 0F63 1EE2 77C8 41C9\
3495 A238 FF7C F507 6573 54FA F46C D42B C0B3"
# FEATURE END
############################################################################
INCREMENT alteramtivsim mgcld 2011.04 13-aug-2011 uncounted \
6D7CE8FDD113FDB05C51 \
VENDOR_STRING=2A865E73 HOSTID=GUARD_ID=T000012345 ISSUER="Altera " \
SN=23912821 SIGN2="03BB 4774 F8FA 6E7A 4B71 5E3B FB9C 92B5 7B2F 3581\
49EF 4558 0945 260B 23C6 1DE0 2BD4 3709 6945 5A70 CAD6 C22B 7A4E 67B7 C8FF 90BB B360\
022C E3DC 32F8"
# FEATURE END
```

Table B–2 describes the different elements of the FEATURE and INCREMENT lines.

Table B–2. Elements of the FEATURE and INCREMENT Code Lines

Element Name	Description
name	The feature name.
daemon	The name of the vendor daemon that manages the feature. This name corresponds to a VENDOR line in network/server licenses.
version	Any version of software released up to and including this date is licensed. Software with a later version date does not function using this license file.
expiration	The date after which the software or service pack cannot be used. The expiration date applies to trial licenses. For Altera license subscriptions, the expiration is permanent.
# of licenses	The number of concurrent users that can run each feature. For some license types, the entry is uncounted.
authcode	An authorization code generated by Altera.
vendor_strings	Specified for certain third-party license features.
hostid_lock	Specified if a feature is node-locked to a software guard, NIC ID, or hard-disk serial number. Intellectual property (IP) MegaCore functions often contain node-locked feature lines in floating licenses. ■ Software guard: HOSTID=GUARD_ID=<*Software guard number*> ■ Network interface card (NIC): HOSTID=<*NIC ID*> ■ Hard-disk serial number: HOSTID=DISK_SERIAL_NUM=<*Hard-disk ID*>
issuer	The name of the ModelSim license issuer.
sign	An authorization code generated by Altera.
TS_OK	Enables remote login for fixed license Quartus II software (includes Altera IP, Nios II Software Build Tools for Eclipse, and DSP Builder).

Table B–3 describes the available Altera license features. This table does not include license features for any intellectual property (IP), development kits, or special license codes used for the Quartus II Limited Edition software.

Table B–3. Available Altera License Features

Feature Name	Description
quartus	Quartus II software
alteramtivsim	ModelSim-Altera VHDL and Verilog HDL Simulator (1)
alteramtivlog	ModelSim-Altera Verilog HDL Simulator (2)

Notes:

(1) The alteramtivsim license subscription supports both VHDL and Verilog HDL, but the software does not support mixed language simulation for ModelSim-Altera version 6.4a and later. For ModelSim-Altera version 6.3g_p1and earlier, the alteramtivsim license subscription supports VHDL only.

(2) The ModelSim-Altera alteramtivlog license subscription supports Verilog HDL only and is available for ModelSim-Altera Edition version 6.3g_p1 and earlier.

Using a FLEXlm Options File

If your license file contains FEATURE and INCREMENT lines for the same software but different maintenance dates, the license server may grant newer licenses from the FEATURE line to users running older versions of software, which leaves fewer licenses for users running newer versions of software.

By default, the license server uses licenses from the first matching FEATURE or INCREMENT line in the license file. If all the licenses in the first FEATURE or INCREMENT line are in use, the license server attempts to use the next FEATURE or INCREMENT if one is available, until it reaches the end of the license file. You can use a FLEXlm options file to control which users can access which licenses by creating pools of licenses for each FEATURE and INCREMENT line.

To create a FLEXlm options file to use with a floating license server, follow these steps:

1. In a new text file, add a GROUP line for each user group you want to create, with a list of use names, separated by spaces for each group, as follows:

   GROUP <*group name*> <*username 1*> <*username 2*>

   Users can be members of more than one group as shown in the following example:

   ```
   GROUP quartus2010 kjones bknight root administrator
   GROUP quartus2009 bknight cface root administrator
   ```

2. Add an INCLUDE line for each INCREMENT and FEATURE line in your license file for the product you wish to control. The VERSION keyword must be set to the maintenance date or version date on the INCREMENT or FEATURE line from the license file. The GROUP field controls which group or groups can use the license line as follows:

   INCLUDE <*product name*>:VERSION=<*maintenance date*> GROUP <*group name*>

   For example:

   ```
   INCLUDE quartus:VERSION=2010.12 GROUP quartus2010
   INCLUDE quartus:VERSION=2009.06 GROUP quartus2009
   INCLUDE ip_base:VERSION=2010.12 GROUP quartus2010
   INCLUDE ip_base:VERSION=2009.06 GROUP quartus2009
   ```

3. Save the options file <*filename*>**.dat**.
4. Add the options file as the last option on the VENDOR line in your license file, as shown in the following example:

```
VENDOR alterad "C:\lic\alterad.exe" "C:\lic\alteraOptions.dat"
```

5. Restart your FLEXlm license server or reread your license file as described in "Rereading an Existing License File" on page 2–15.

License.dat Example Files

This section includes several example **license.dat** files. License files vary, depending on the type of licenses and the software that is enabled. License examples in this section should be used only for reference; they are not valid for actual licensing.

Fixed PC Software Guard License Example

Figure B–3 shows a **license.dat** file that contains a license for the Quartus II software and the ModelSim-Altera Edition software. This license file works on a PC that has software guard number T000012345 attached to its parallel port.

Figure B–3. Fixed PC Software Guard License Example

```
############################################################################################
FEATURE START
# The following is a feature line for ModelSim Altera Edition
# Number of seat licenses is 1
# No license expiration date
INCREMENT alteramtivsim mgcld 2011.04 13-aug-2011 uncounted \
     6D7CE8FDD113FDB05C51 \
     VENDOR_STRING=2A865E73 HOSTID=GUARD_ID=T000012345 ISSUER="Altera " \
     SN=23912821 SIGN2="03BB 4774 F8FA 6E7A 4B71 5E3B FB9C 92B5 7B2F 3581 49EF 4558 \
     0945 260B 23C6 1DE0 2BD4 3709 6945 5A70 CAD6 C22B 7A4E 67B7 C8FF 90BB B360 022C
# FEATURE END
############################################################################################
FEATURE START
# The following is a feature line for Quartus II Subscription Edition Fixed
# Number of seat licenses is 1
# No license expiration date
FEATURE maxplus2 alterad 2011.04 permanent uncounted 6D103456930D \
     HOSTID=GUARD_ID=T000012345 SIGN="0116 7EF5 F487 4771 3456 9278 4DA6 80CF 4131 \
     95C6 1F1E D54F 8429 C807 6A8B 0A13 BC80 A11D 0F6E AC08 4FA8 0B6E C267 9BBB \
     C037 0FAD FB9E FFD8 5CF4"
FEATURE quartus alterad 2011.04 permanent uncounted 08E2123438D3 \
     HOSTID=GUARD_ID=T000012345 TS_OK SIGN="0403 403E CF63 6460 3C3D 2AA7 60B3 A074\
     77A7 670A 3C5D BF03 9391 3476 D1DA 14E7 56FA 0F63 1EE2 77C8 41C9 3495 A238 F507\
     6573 54FA F46C FF7C D42B C0B3"
# FEATURE END
############################################################################################
End of Altera Corporation Software and/or Intellectual Property License File.
Issued 05/13/2010
```

Floating Network License Example

Figure B–4 shows a **license.dat** file that contains a license for the Quartus II software, the ModelSim-Altera Edition software, and the IP Base Suite. This license specifies that two users can run the software simultaneously and works when the PC with NIC ID `00B0D0ABCCBA` is set up as a license server and the users point to the license location.

Figure B–4. Floating Network License Example

```
############################################################################################
SERVER <hostname> 00B0D0ABCCBA <port number>
VENDOR alterad <path to daemon executable>
USE_SERVER
############################################################################################
FEATURE START
# IP Base Suite (FIR, FFT, NCO, DDR, DDR2, DDR3, QDRII, DDR/DDR2 Library, RLDRAM II
# SerialLite II, S2GXGEMAC)
# Number of seat licenses is 2
# No license expiration date
PACKAGE ip_base alterad COMPONENTS="6AF7_0034 6AF7_0012 6AF7_0055 6AF7_00A8 6AF7 \
      00A7 6AF7_00A8 6AF7_00C2 6AF7_00BE 6AF7_00BF 6AF7_00A4 6AF7_00AC 6AF7 00AD \
      6AF7_0014" OPTIONS=SUITE \
      IGN="1A76 FAF3 0CFA 9A0B D5A9 C867 4923 F223 AA3B C17B 6F11 98E6 8056 178E A795\
  _    1F63 7695 1260 3D0C F662 2657 4AFF 25BD 3029 0C7C 1B3A 542A 3948 9F90 03CE"\
FEATURE ip_base alterad 2012.05 permanent 2 D7564046983D \
VENDOR_STRING="iiiiiiiihdLkhIIIIIIIIUPDuiaaaaaaaa11X38DDDDDDDDpjz5cddddddddJJJJJbqIh0
uuuuuuuugYYWiVVVVVVVVbp0FVHHHHHHHHBUEakfffffffffD2FFRkkkkkkkkWL$84" \
      DUP_GROUP=UHD SIGN="0A9A EB33 1A75 A16D 5949 B37B 015F 1A69 9FD4 CED3 ABCE \
      A628 9FDE 4846 455C 01E1 064B D881 C079 215C FBAE 86B2 AC3F 4210 F471 6298\
      A340 CFC8 BCDA C218"
# FEATURE END
############################################################################################
FEATURE START
# The following is a feature line for Quartus II Subscription Edition Floating
# Number of seat licenses is 2
# No license expiration date
FEATURE maxplus2 alterad 2012.05 permanent 2 71781799E9FF SIGN="0D15 \
     DBE8 1893 DA63 0658 4F28 D47C 64D8 A9AB 4E84 A3EE 4257 F592 753F E261 0FD9 \
     C334 F2E9 C9A2 5316 CB42 EF0F 188D 7933 5134 6FDC 0BA8 6CCD FF8A 403D"
FEATURE quartus alterad 2012.05 permanent 2 8D7C83160D8A SIGN="15F3 2C48 65E9 1EAC \
      5E5F 19A0 1C53 7DF1 4BEA D4EA 422A 92C7 9CC0 8B45 4A3D 0674 667C 1FB9 504E \
      D960 8FC2 1B46 94C3 035B 3711 651F D889 0B03 99F7 48EC"
# FEATURE END
############################################################################################
# End of Altera Corporation Software and/or Intellectual Property License File.
Issued 05/13/2010
```

This chapter provides additional information about the document and Altera.

Quartus II Getting Started Tutorial

The Quartus II software includes the Quartus II Getting Started Tutorial. The modules of this tutorial teach you how to use basic and advanced features of the Quartus II design software, including design entry, compilation, timing analysis, programming, incremental compilation, on-chip debugging, and the Qsys system integration tool.

This tutorial requires a sound card, speakers, and at least 1024x768 display resolution.

For more information about the Quartus II Getting Started Tutorial, refer to the Quartus II Software Interactive Tutorial online course from the Altera Training page.

Quartus II Help

The Quartus II software includes a platform-independent Help system that provides comprehensive documentation for the Quartus II software and more details about the specific messages generated by the software.

For more information about using Quartus II Help, refer to *Using Quartus II Help Effectively* in Quartus II Help.

Document Revision History

The following table shows the revision history for this manual.

Table Info–1. Document Revision History (Part 1 of 2)

Date	Version	Changes
June 2012	12.0.0	■ Updated Internet browser information in the "System Requirements" on page 1–1 section. ■ Updated the RPM package information in the "Download and Installation Prerequisites" on page 1–4 section. ■ Added the "Mentor Graphics AXI (Advanced eXtensible Interface) Verification IP Suite Altera Edition of Bus Functional Models (BFMs) and Inline Monitor for AXI3" on page 2–2 section. ■ Updated the "Obtaining a License File" on page 2–6 section. ■ Updated the Mentor Graphics vendor daemon executable paths in the "Modifying the Network License File" on page 2–12 section. ■ Updated the "Specify the License for the ModelSim-Altera Edition Software" on page 2–13 section. ■ Updated the "Quartus II NativeLink Environment Variables" on page 3–2 section.

Table Info–1. Document Revision History (Part 2 of 2)

Date	Version	Changes
November 2011	11.1.0	■ Updated the "Altera Software" on page 1–1 section. ■ Updated the "Hardware" on page 1–2 section. ■ Updated the "Uninstalling Altera Software" on page 1–2 section. ■ Updated the "Modifying Altera Software" on page 1–3 section. ■ Updated the "Download and Installation Prerequisites" on page 1–4 section. ■ Updated the "Quartus II Software Evaluation Period" on page 2–3 section. ■ Updated the "UNIX Host ID" on page 2–4 section. ■ Updated the "Setting Up a Fixed License" on page 2–10 section. ■ Updated the "Setting Up a Floating Network License" on page 2–11 section. ■ Added the "Using a FLEXlm Options File" on page B–4 section.
May 2011	11.0.0	■ Updated Chapter 1, Installing Altera Software to incorporate changes with the Nios II Embedded Design Suite (EDS) installation. ■ Updated the "Hardware" on page 1–2 section. ■ Updated the "Download and Installation Prerequisites" on page 1–4 section. ■ Added the "Intellectual Property (IP) Cores" on page 2–2 section. ■ Updated the "Development Kits Containing the Quartus II Software" on page 2–2 section. ■ Updated the "Quartus II Software Evaluation Period" on page 2–3 section. ■ Updated the "Licensing Requirements" on page 2–3 section. ■ Updated the "Requesting a License File" on page 2–5 section. ■ Removed the "Specifying the License for Intellectual Property (IP) Cores, DSP Builder, or Intellectual Property (IP) and Development Kits" section. ■ Updated the "Upgrading the FLEXlm License Manager Server Software" on page 2–14 section. ■ Updated the "Rereading an Existing License File" on page 2–15 section. ■ Updated the "Quartus II Getting Started Tutorial" on page Info–1 section.
December 2010	10.1.0	■ New document template. ■ Updated Chapter 1, Installing Altera Software to incorporate changes with the Altera Complete Design Suite DVDs and device support installation. ■ Updated the default FLEXlm software version in "Upgrading or Setting Up a License Manager Server" on page 2–14. ■ Linked procedures to Help topics.
July 2010	10.0.0	Updated the manual to incorporate changes made to the Altera Installer and the Self-Service Licensing Center.
November 2009	9.1.0	The new manual merges content from the *Quartus II Software Installation & Licensing for Windows and Linux Workstations* manual and *AN 340: Altera Software Licensing*.

How to Contact Altera

To locate the most up-to-date information about Altera products, refer to the following table.

Contact (1)	Contact Method	Address
Technical support	Website	www.altera.com/support
Technical training	Website	www.altera.com/training
	Email	custrain@altera.com
Product literature	Website	www.altera.com/literature
Nontechnical support (general)	Email	nacomp@altera.com
(software licensing)	Email	authorization@altera.com

Note to Table:

(1) You can also contact your local Altera sales office or sales representative.

Typographic Conventions

The following table shows the typographic conventions this document uses.

Visual Cue	Meaning
Bold Type with Initial Capital Letters	Indicate command names, dialog box titles, dialog box options, and other GUI labels. For example, **Save As** dialog box. For GUI elements, capitalization matches the GUI.
bold type	Indicates directory names, project names, disk drive names, file names, file name extensions, software utility names, and GUI labels. For example, **\qdesigns** directory, **D:** drive, and **chiptrip.gdf** file.
Italic Type with Initial Capital Letters	Indicate document titles. For example, *Stratix IV Design Guidelines*.
italic type	Indicates variables. For example, *n* + 1. Variable names are enclosed in angle brackets (< >). For example, *<file name>* and *<project name>***.pof** file.
Initial Capital Letters	Indicate keyboard keys and menu names. For example, the Delete key and the Options menu.
"Subheading Title"	Quotation marks indicate references to sections in a document and titles of Quartus II Help topics. For example, "Typographic Conventions."
`Courier type`	Indicates signal, port, register, bit, block, and primitive names. For example, `data1`, `tdi`, and `input`. The suffix `n` denotes an active-low signal. For example, `resetn`. Indicates command line commands and anything that must be typed exactly as it appears. For example, `c:\qdesigns\tutorial\chiptrip.gdf`. Also indicates sections of an actual file, such as a Report File, references to parts of files (for example, the AHDL keyword `SUBDESIGN`), and logic function names (for example, `TRI`).
↵	An angled arrow instructs you to press the Enter key.
1., 2., 3., and a., b., c., and so on	Numbered steps indicate a list of items when the sequence of the items is important, such as the steps listed in a procedure.
■ ■ ■	Bullets indicate a list of items when the sequence of the items is not important.
☞	The hand points to information that requires special attention.

Visual Cue	Meaning
	The question mark directs you to a software help system with related information.
	The feet direct you to another document or website with related information.
	The multimedia icon directs you to a related multimedia presentation.
	A caution calls attention to a condition or possible situation that can damage or destroy the product or your work.
	A warning calls attention to a condition or possible situation that can cause you injury.
	The envelope links to the Email Subscription Management Center page of the Altera website, where you can sign up to receive update notifications for Altera documents.
	The feedback icon allows you to submit feedback to Altera about the document. Methods for collecting feedback vary as appropriate for each document.